

**Brazilian Guitarfish, Daggernose Shark, Graytail Skate, Narrownose Smoothhound,
Striped Smoothhound, Argentine Angel Shark, and Spiny Angel Shark Status
Review Reports: Peer Review Comments**

We solicited review of the Draft Brazilian Guitarfish, Daggernose Shark, Graytail Skate, Narrownose Smoothhound, Striped Smoothhound, Argentine Angel Shark, and Spiny Angel Shark Status Review Reports from twenty-two potential reviewers. Reviewers were asked to review certain species depending on their area of expertise. Nine persons agreed to be reviewers and provided reviews. Reviewer comments are compiled below by species from comments on drafts of the manuscript and are not in the order of the reviewer identification list below.

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Graytail skate

Note: Grammatical changes included as “track changes” in the document were accepted, where applicable.

Comment: My recommendation = no ESA listing necessary.

The most recent size structure graph suggests recovery. Area closures are in place to facilitate rebuilding and CPUE's have been increasing in response to this closure. The Falklands landings data have been fairly close (most years) to MSY target of 3,000 tons from 1991-2001. This species is still quite abundant in the bycatch. I think there are definite threats and a cautionary approach would be prudent, e.g. stop managing skates as a mixed-species fishery, as life histories vary greatly among species. The data presented herein do not fit the criteria for ESA listing.

My assessment is based largely on data reported from the Falkland Islands, as this area provided the most comprehensive information available for the species. The lack of data from other countries may mask severe depletions elsewhere, thus more data is needed to better characterize the status of this species.

Status Review questions:

1. In general, does the Status Review include and cite the best scientific and commercial information available on the species, its biology, stock structure, habitats, threats, and risks of extinction?

Yes.

2. Are the scientific conclusions factually supported, sound, and logical?

As far as I can tell, though information is lacking throughout the majority of their range.

3. Where available, are opposing scientific studies or theories acknowledged and discussed?

Yes, I have highlighted those throughout.

4. Are uncertainties assessed and clearly stated?

Yes, I mentioned several above and throughout.

Response: Comments were incorporated where applicable.

Comment: That's outdated phylogeny, they are now in the family Arhynchobatidae (see Naylor's Chondrichthyan Tree of Life, <http://sharksrays.org/>)

Response: The phylogeny was updated

Comment: Historically found or currently found? Presumably the current range is constricted.

Response: Historically found.

Comment: Only 3 specimens were reported

(https://www1.data.antarctica.gov.au/aadc/biodiversity/collection_taxa.cfm?collection_id=66) between 1968-1999, all from the same collection (cruise, station, time). Given the intensive coverage of Prydz Bay

(https://www1.data.antarctica.gov.au/aadc/biodiversity/collection_maps.cfm?collection_i

[d=66](#)), there should be other records of this species if the species truly inhabits those waters. I would mention these records with the caveat that it is likely a mis-identification.

Response: Numbers were corrected. There is a caveat that the records are likely not valid is already included in the text.

Comment: The area is located in the Southern Ocean, not Pacific. It is due south of the Indian Ocean.

Response: The text was corrected.

Comment: Some language translations make no distinction between “ray” and “skate”, though this is taxonomically incorrect to do so.

Response: Corrected “ray” to “skate”

Comment: Arkhipkin et al. 2008 found a max age of 28 yrs, so this size at 50% maturity is probably inaccurate.

Response: We retained the information in the status review because we are trying to provide the most comprehensive account of the species life history.

Comment: On page 6, you quote 39 and 34 degrees as the ranges for Pacific and Atlantic.

Response: We corrected to match page 6.

Comment: Invalid taxonomic term – there is no Family “Bathyradjidae”. You might say “Bathyraja spp.” (to refer to all the species within that Genus).

Response: The taxonomy was corrected.

Comment: For some reason, GBIF has each record listed twice, so it looks like six skates. If you look at the catalog number of each entry, you’ll see there are only three records. Or better yet, go directly to the AADC database, from which GBIF compiles the data.

Response: The numbers were corrected.

Comment: Double-check this – I only found 1 record from 2006. The specimen is in the Yale museum. Perhaps it was duplicated as above?

Response: The numbers were corrected.

Comment: Are you sure there was no gear modification or shift in sampling area during this time series?

Response: The sampling area was the FICZ. The gear was commercial trawlers, but specifics were not listed. We included some clarification in the text.

Comment: This is in stark contrast to Fig. 6 – largest skate in Fig.6 is 8- cm, here it is 95 cm. Peak abundance at 63 cm in this graph, but last graph (2006) in Fig 6 it is 45 cm. If these numbers are valid, this would indicate a recovery (increase in mean size and overall size classes). There may be gear selectivity at play in Fig 6 vs Fig 7?? I don’t have those references, so I was unable to check.

Response: Gear selectivity may be occurring. We presented both figures as the goal of this review is to provide the most complete and up to date data on graytail skate fisheries throughout their range.

Comment: Define “tuned” as used here?

Response: “Tuned” is defined as a subset of the effort and catch.

Comment: Table 5 indicates the Falklands adhere to that target most years (with a few yrs of overshoot)

Response: We didn’t feel that this needed to be explicitly included in the text.

Comment: Typo? In the Pacific, the northernmost extent of the range is 39 degrees (page 6).

Response: 20 degrees S is the latitude included in the original source (McCormack et al., 2007).

Daggernose shark

Note: Grammatical changes included as “track changes” in the document were accepted, where applicable.

Comment: There seems to be an inconsistency between the range depicted in the map (that extends eastward until the state of Rio Grande do Norte, longitude ~36°W), and the range reported in the text above, with an easternmost limit in the Baía do Tubarão (state of Maranhão), longitude ~ 44°W.

Response: We corrected the map to match the information from the text and deleted the IUCN range map.

Comment: Since Compagno (1984) is an old reference and the estimated size at birth in Lessa et al. (2000) is larger than the range that it reports, I suggest changing the verbal tense herein used.

Response: Corrected.

Comment: I was wondering if there is any more data (e.g. size or sex) to include in this table, since most records are very little informative. For example, the reader cannot even assess if there could be any repetitions (e.g. the same specimen reported twice) among all the specimens from French Guiana with no year or area information.

Response: In most instances size and sex are not included in records from the GBIF database for this species.

Comment: It is not completely clear whether this 20-35% decline pertains to the distribution range of the daggernose shark or to a worldwide global average.

Response: We clarified that this is a global decline

Comment: This is not the right reference, it should be DeMaster et al. (2001), indeed cited in Knip et al., (2010).

Response: DeMaster et al., (2001) is a similar paper to Knip et al., (2010), but about marine mammals. DeMaster et al., (2001) cites a source from the International Panel on Climate Change for this statistic. This original source could not be found so the reference was left as Knip et al. (2010).

Comment and Response: The reviewers also provided additional sources of information regarding mangrove loss in Brazil, the updated Brazilian endangered species act, and the Brazilian National Action Plan for Conservation of Sharks and Rays. We incorporated all relevant information to the Status Review.

Striped smoothhound

Note: Grammatical changes included as “track changes” in the document were accepted, where applicable. Some additional literature was suggested and incorporated into the status review if the articles could be located and deemed acceptable.

Comment: How is this possible? *M. canis* reaches a max size of 150 cm, very similar to the max size of *M. fasciatus* (162 cm)? Perhaps those *M. canis* records are actually *M. norrisi* (a species similar in appearance that does not reach 100 cm).

Response: The information was updated based on Rosa and Gadig (2010).

Comment: It would be helpful to indicate the names of some of the more important places referenced throughout the document.

Response: The area of concentrated abundance between Rio Grande and Chuí in Rio Grande do Sul was highlighted in red in Figure 1.

Comment: There could be compensatory response to fishing mortality, i.e. smaller population could lead to shorter gestation and reduced size at maturity (see Romine et al., 2013 - Compensatory Growth of the Sandbar Shark in the Western North Atlantic Including the Gulf of Mexico)

Response: The text was updated to reflect this.

Comment: There are more records available in the MOVI inventory (Soto and Mincarone, 2004) – you can get the pdf here and search the term “fasciatus” within to find all the records: http://www.geoprof.org/pdf/pub_82.pdf. Likewise, there are more records mentioned in Rosa and Gadig, (2010) (though some or all of those might be duplicates of the MOVI inventory paper).

Response: Any missing records were included in the status review.

Comment: Given that a formal assessment of the stock has never been done, I don’t think anyone can claim that this species has a “naturally low abundance”. There is the possibility that portions of the population reside in waters that have been unsampled (or undersampled) over the years.

Response: The text of the status review was updated to reflect this.

Comment: This needs to be resolved before a fair assessment can be made. An email to the author of the paper should suffice. Most importantly, did the survey design change between 1994 and 1999 (which may have resulted in the exclusion of this species in the 1999 survey)?

Response: We were unable to make contact with the author to obtain further details about this survey.

Comment: You should state the size range of what is considered “neonate” in this caption, especially since the point made in the text is that neonates have declined.

Response: We included the size range 35-48 cm in the Figure caption and text.

Comment: In Lessa et al, (1999) it says (bad translation): Protection Location: Rio Grande do Sul and Santa Catarina coast and also mentions a proposed expansion to “the protected area of Lagoa do Peixe the Solitude (RS), forming a 'biodiversity corridor' to depths of 500 m expansion of Island Grove Unit (SC)”

Response: This section has been updated due to the listing of the striped smoothhound on Brazil's endangered species act in Dec. 2014. This statement is no longer included in the text.

Comment: Cazón is the common name of the school shark *Galeorhinus galeus*.

Response: Cazón was deleted.

Comment: Non placental should be “non-placental viviparous”, or better could be “matrotrophy viviparous” because the maternal organism provides supplemental nutrients beyond those accounted for by yolk. (Hamlett et al., 2005; Galíndez et al., 2010).

Response: Galindez et al., (2010) states that striped smoothhound are placental viviparous, as are several other species in the *Mustelus* genus.

Galíndez, E.J., M.C. Díaz Andrade, A.C. Moya, S. Estecondo. 2010. Morphological changes in the pregnant uterus of the smooth hound dogfish *Mustelus schmitti* Springer, 1939 (Gatuzo) (Condrichthyes, Triakidae). Microscopic study and phylogenetic reproductive implications. Internal Journal of Morphology. 28: 1003-1010.

Comment: There is new information in Massa, A.M. 2013. “Peces cartilaginosos (clase Chondrichthyes) de la región costera bonaerense y uruguaya: Situación, impacto y grado de vulnerabilidad de las distintas especies frente a la presión pesquera”. PhD Thesis. Facultad de Ciencias Naturales y Exactas. Universidad Nacional de Mar del Plata.

Response: We added all new sources of information from this thesis.

Comment: It is uncommon to see a *M. fasciatus* in Argentina. Occasionally during summer some *M. fasciatus* came to the southwestern Atlantic arriving to Uruguay and Argentina, but really is not common. The species has more restricted geographic distribution than it is supposed, at least nowadays.

Response: The text states that the striped smoothhound occurs sporadically in Argentina.

Comment: It is rare, but it seems that the distribution of the striped smoothhound shrank during these years and now it is not common to find it in Argentina.

Response: As stated in the text, the striped smoothhound occurs sporadically (rarely) in Argentina.

Comment: There are caveats associated with the taxonomy

Response: We added the suggested caveats related to the taxonomic issues of smoothhounds in the southwestern Atlantic in the Life History section.

Narrownose smoothhound

Note: Grammatical changes included as “track changes” and comments in the document were accepted, where applicable. Some additional literature was suggested and incorporated into the status review if the articles could be located and deemed acceptable.

Comment: Size at first breeding and mean total length have decreased in Argentina (Diaz de Astarloa, J.M., Carozza, C.R., Guerrero, R.A. Baldoni, A.G. and Cousseau, M.B. 1997. Algunas características biológicas de peces capturados en una campaña costera invernal en 1993, en el área comprendida entre 34°S y 42°S (Atlántico Sudoccidental) y su relación con las condiciones ambientales. Inf. Téc. INIDEP No. 14.)

Response: We added this information to the status review.

Comment: Ovoviviparous is an outdated term, usually called “yolk-sac viviparous”. However all other triakids studied are either placental or exhibit mucoid histotrophy. So it is doubtful that this species is yolk-sac viviparous. It was probably assumed to be so and reported as such in the literature.

Musick, J. A., and J. K. Ellis. 2005. Reproductive evolution of chondrichthyans. Pages 45-79 in W. C. Hamlett, editor. Reproductive Biology and Phylogeny of Chondrichthyes: Sharks, Batoids, and Chimaeras. Science Publishers, Inc., Enfield, New Hampshire.

Response: We corrected this.

Comment: The range is highly dubious. The lower value is likely due to abortions and the higher value is probably attributed to a different species misidentified as *M. schmitti*. You state in the next sentence that mean fecundity is 4-6, it would be very unusual (physically impossible due to space limitations?) for a female to have three times more pups than the average. Given that you didn't cite a reference for this range, it might be best to simply omit this sentence.

NMFS4: This information was from the IUCN Red List assessment. The litter size varied between 2 and 14 pups.

Comment: Add information from Olivier RS, Bastida R & Torti MR (1968) Sobre el ecosistema de las aguas litorales de Mar del Plata. Niveles tróficos y cadenas alimentarias pelágicos demersales y bentónicos-demersales. Servicio de Hidrografía Naval H 1025: 1-45

Response: We added this reference along with new information from track changes.

Comment: *Mustelus schmitti* is not ovoviparous, it is viviparous. Moreover, it should be “non-placental viviparous”, or better could be “matrotrophy viviparous” because the maternal organism provides supplemental nutrients beyond those accounted for by yolk. (Hamlett et al., 2005; Galíndez et al., 2010)

Response: We corrected this.

Comment: Add information and figure from Hozbor, N.M., Saez, M.B., and Massa, A.M. 2010. Edad y crecimiento de *Mustelus schmitti* (gatuza), en la región costera bonaerense y uruguaya. Informe de Investigación INIDEP N° 49. 15 pp and Massa, A.M., Lasta, C. and Carozza, C. 2004 b. Estado actual y explotación del gatuza (*Mustelus*

schmitti). En: Sanchez, R. & Bezzi, S. (Eds). El Mar Argentino y sus recursos pesqueros. Tomo 4. Biología y evaluación del estado de explotación. Publicaciones especiales INIDEP, Mar del Plata, 67-83

Response: We included the updated information and the figure.

Comment: Massa and Hozbor (2008) detected a decrease in the abundance of *Mustelus schmitti* in Argentina from the years 1993 to 2005. (Massa, A. M. and Hozbor, N. 2008. Estimación de abundancia de peces cartilaginosos en el Atlantico)

Response: We updated the status review with this new information.

Comment: I recommend two papers that stated how trawling affects narrownose smoothhound benthic habitat:

Carranza, A. and Horta, S. (2008) Megabenthic gastropods in the outer Uruguayan continental shelf: composition, distribution and some effects of trawling. Revista de Biología Marina y Oceanografía 43: 137-142

Carranza, A. (2006) Large gastropods by-catch in the hake fishery at the Argentinean – Uruguayan common fishing zone. Comunicaciones de la Sociedad Malacológica del Uruguay 9: 61-67

Response: We added information from these two sources. “Studies on the effects of trawling within the narrownose smoothhound’s range have shown that large gastropods are frequently injured when caught as bycatch in hake trawls and discarded (Carranza 2006, Carranza and Horta 2008). Though the animals studied are not part of the narrownose smoothhound diet, damaged habitat and relocated animals could have indirect effects on the smoothhound by attracting scavengers, altering trophic relationships and potentially increasing competitive interactions (Carranza 2006). It is also likely that the animals that the narrownose smoothhound eats are similarly affected by trawling activities.”

Comment: There are caveats associated with the population genetics.

Response: We added the suggested caveats related to the genetics issues of smoothhounds in the southwestern Atlantic in the Life History section.

Brazilian guitarfish

Note: Grammatical changes included as “track changes” in the document were accepted, where applicable. Some additional literature was suggested and incorporated into the status review if the articles could be located and deemed acceptable.

Comment: There is some scientific information to consider which are listed below.

1. In Brazil the name cação-viola is also very common and it is specially used by fisherman of southeast coast.
2. Goitein et al. 1998, studying the diet of *R. horkelli* in Ubatuba (Southeast of Brazil) found that it feeds mainly on free living crustaceans, like Caridea shimps and decapods.
3. The present document mentioned the difficult to recognize the two *Rhinobatos* sp., not only because the morphological similarity among them but also to the fishing practice of heading and gutting the rays before landing. It should be important to mention that there is one taxonomic revision on *Rhinobatos* sp. in progress. This revision is being undertaken by the PhD student Camila Mayumi Hirata dos Santos and entitled: “Revisão taxonômica das raias-viola, gênero *Rhinobatos* link, 1790 (Chondrichthyes, Rhinobatidae) do Atlântico ocidental”.
4. There are some growth and demography parameters available and with fewer differences than those present in this document. Caltabellota (2014) estimated growth parameters for *Rhinobatos horkelli* being: $L_{\infty} = 124.41$; $k=0.192$; $t_0=-1.603$; Longevity=18.24, for females; and $L_{\infty} = 116.84$; $k=0.249$; $t_0=-1.08$; Longevity=13.87, for males. The same author also evaluated five possible fisheries scenarios. The worse scenario displayed a decreasing of 25% on captures every 2.73 years. In the absence of the fishing, population trends an increase about 9%/year. The differences between the parameters cited in document and those could be due to population differences or the lowest age of maturity (5 years, for both sexes) used by Caltabellota (2014).
5. In this document is cited that there is no specific information available on how trawling has affected the Brazilian guitarfish's habitat. However, knowing that they feed mainly on benthic community, we can assume the trawling may affect the food chain in which *R. horkelli* is inserted.
6. Two important documents are attached. The first, Lessa et al (1999) cited that, despite having laws forbidding the *R. horkelli*, captures by artisanal and industrial fisheries are common. Lessa et al (2005) have proposed a moratorium of *R. horkelli* in Brazil for indefinite term and the establishments of excluding fishing areas. The knowing of this information was important to support the insertion of this species as critically endangered (Directive nº 5/2004; Directive nº 445/2014)
7. Two important, legal instruments for species' protection have been recently created:

- 7.1. Under the Ministry of Environment of Brazil's Directive nº 445 of 2014, the Brazilian guitarfish is classified as critically endangered species - CR (*i.e.* that facing a very high risk of extinction in the wild). Therefore, the catching of the species, as well as its transport, processing, storage, marketing and fishery management are prohibited in Brazil. This species was already classified as CR in the previously applicable 2004 Directive of Ministry.
- 7.2. The Chico Mendes Institute for Biodiversity Conservation*, under the Directive nº 125, 04 December 2014, approves the National Action Plan for Conservation of Sharks and Rays threatened with extinction, focusing on 12 species endangered (including the Brazilian guitarfish), setting the goal, general and specific objectives, actions, implementation, scope and ways of implementation and supervision of the Action Plan. *(Chico Mendes Institute for Biodiversity Conservation is the Brazilian Ministry of the Environment's administrative arm. Its acronym is "ICMBio")

Response: All new information was updated as suggested and information from Caltabellotta (2014) was included in the document, as suggested.

Argentine angel shark

Note: Grammatical changes included as “track changes” in the document were accepted, where applicable. Some additional literature was suggested and incorporated into the status review if the articles could be located and deemed acceptable.

Comment: Please, note that this paper refers to all *Squatina* species as *S. argentina*. So, its findings are more likely to be applicable to *S. guggenheim*, which is much more common than *S. Argentina* in the Argentine-Uruguayan Common Fishing Zone.

Response: We noted this in text.

Comment: The record from the GBIF database is most likely a mislabelling of the country. La Plata River is no doubt referring to the large estuary located between Uruguay and Argentina, where angel sharks are common in its estuarine and marine zones. The 1934 GBIF record says “Bahia bay, s.off. Medano”. Medano, most likely refers to the town of Médanos, located at 38°49' S-62°40'W. This town is very close to Bahía Blanca, which is the name of both a much larger town (widely known in Argentina just as “Bahía”) and a bay, where angel sharks are also common. My own field experience in these two areas indicate that *S. guggenheim* is overwhelmingly more common than *S. argentina* in both places. While I have examined hundreds of specimens of *S. guggenheim*, I have personally seen only one specimen of *S. argentina*, which was from the La Plata River estuary.

Response: Based on this comment, we clarified the information in the text.

Comment: Angel sharks in the diet of sea lions could be a case of misidentification. It is very rare that the only angel shark consumed by sea lions in Cabo Polonio were *S. argentina*. This species could be a food item of sea lions, but *S. guggenheim*, which is more common in that area, should also be preyed upon.

Response: Though it may be likely that *S. guggenheim* was preyed upon in addition to *S. argentina*, the authors of the paper published only that *S. argentina* was being consumed by sea lions.

Comment: There are concerns about the reliability of the GBIF database records.

Response: We address issues of the species range and accepted the suggestion of using Vaz and Carvalho’s (2013) most recent range estimate based on revised taxonomy.

Spiny Angel Shark

Note: Grammatical changes included as “track changes” in the document were accepted, where applicable. Some additional literature was suggested and incorporated into the status review if the articles could be located and deemed acceptable.

Comment: The name hidden angel shark has been proposed for *S. occulta*. Application of this name to *S. guggenheim* stems from the previous opinion that *S. occulta* was a junior synonym of *S. guggenheim*, which was spread widely by the book by Compagno et al. (2005). Hidden angel shark should be applied only to *S. occulta*.

Response: Hidden angel shark was deleted from the status review.

Comment: Please see the attached version of this figure. The area that I enclosed in red should be taken off the geographic range of *S. guggenheim*. This area is the inner zone of the Río de la Plata and is pure freshwater year round. Its fish fauna is composed of obligate freshwater species and angel sharks do not occur there.

Response: Freshwater region of Río de la Plata was removed from the range maps

Comment: I suggest to add the copper shark to the first sentence and delete the final (highlighted) sentence. The actual source of this claim is Lucifora et al. (2009b; attached).

Response: We updated the status review based on this comment.